A Novel Thin Microwave Absorber Based on the Concept of Equivalent Transformation Method of Material Constant

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The authors have thus far proposed the effective methods of changing and improving the matching characteristics of a single magnetic EM wave absorber [1–3]. These methods based on not by adjusting the processing conditions to produce a new magnetic material such as ferrite, but by applying static magnetic fields to a magnetic absorber, by adjusting the geometrical shape of it, and by attaching conductive patterns to the surface of absorbers etc. We have called these methods "Equivalent Transformation Method of Material Constant (ETMMC)" [4]. To change the matching frequency characteristic toward higher frequency regions from the original one, small holes are punched out in a magnetic absorber [2]. Secondly, to shift the matching frequency characteristic toward low frequency regions, conductive patterns are attached periodically to the surface of a ferrite absorber [3, 4].

In this paper, a thin and light weight EM-wave absorber is newly proposed. It becomes possible to merge both the competing characteristics by means of punching out small holes in the magnetic absorber and by attaching periodical conductive patterns to the surface of it as shown in Fig. 1. The question is what kinds of matching frequency characteristic are obtained by combining both the competing characteristics of changing the matching frequency toward high or low frequency regions. The detailed matching characteristics of the present absorber are investigated based on FDTD analysis. The matching mechanism is clarified from input admittance chart viewpoints. Consequently, a new thin and light weight microwave absorber can be realized with the thickness of 2.0 mm at the frequency from 2.45 GHz to above 6 GHz and light weight due to small holes occupying 55% of the area to carbonyl absorber.

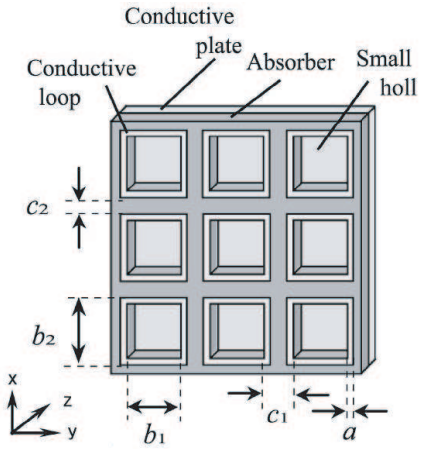

Figure 1: Fundamental construction of present absorber.

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